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ON THE SWARMING OF HETERONEREIDS IN THE GULF OF MANNAR¹

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THE periodic swarming of the reproductive individuals of various nereid worms to the surface waters is a well known phenomenon reported from many parts of the globe. An analysis of the factors involved in the periodicity in marine invertebrates in general has been given in the review by Korringa (1947). Other later studies in connection with the problem of marine fouling, such as by Dew and Wood (1955), have also indicated the periodicity in spawning and settlement of larval forms.

The construction of a *kelong* (Chellappa, 1959) in the reef enclosed waters of the Gulf of Mannar, primarily for purposes of experimental fishing, made it possible to make some studies on the swarming behaviour of certain polychaetes, a note of which was made earlier by Tampi (1958). The present account similarly summarises the observations on the pelagic heteronereids from the same locality during the years 1956 and 1957.

Vertical hauls by means of a plankton net were made underneath a low wattage electric lamp, suspended about 18 inches above the surface of water. The hauls were usually repeated and a quick inspection carried out for the presence of polychaetes after emptying collections into a glass jar. It was observed that the polychaete worms, which generally had a creamy colour, wriggled actively for a few seconds soon after collection before becoming quiescent and coming to rest at the bottom of the container. The time of occurrence of the worms was noted after which the collections for that night were pooled and preserved for later study. The data thus gathered are obviously inadequate for any precise quantitative study. The actual number of heteronereids obtained in the collections on the various nights, along with the high tide levels as well as the changing phases of the moon as depicted in Figure 1, is intended only to give the relative abundance on the different occasions. It will also provide some points of general interest which will help in appreciating the phenomenon of swarming which has been reported from our waters hitherto only by Aiyar and Panikkar (1937).

The phenomenon usually manifests itself from January and lasts through the succeeding four months until the beginning of May, after which collections from the same locality failed to show the presence of these polychaetes. In 1956, however, the swarming was seen only after the middle of February and a definite intensity, reaching a maximum of 830 individuals in one night, was observed between the last week of March and the first week of April.

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The worms begin appearing in the collections about two hours after sunset and on nights when the phenomenon is pronounced their number increases during the succeeding hours to attain a maximum before midnight. Then the decline is fairly rapid and the worms are very rarely seen in the hauls. A series of collections

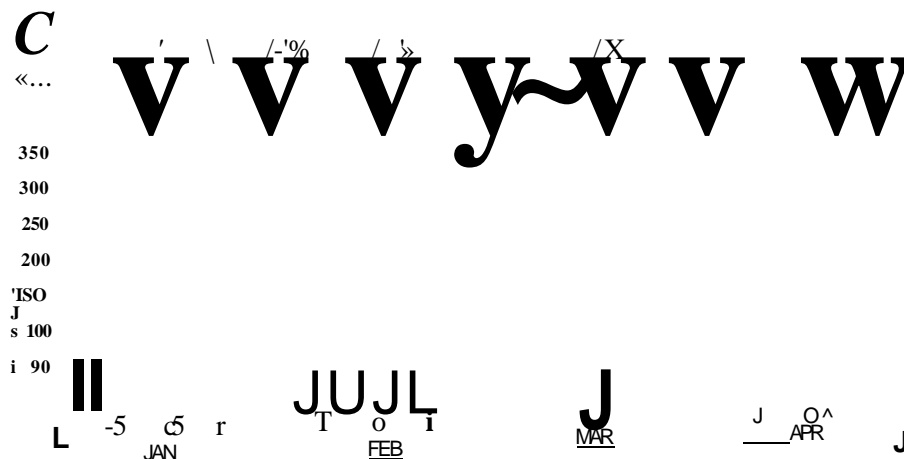


FIG. 1. Shows the actual number of heteronereids collected on the various nights during 1957.

made at intervals of one hour is represented in Figure 2 where the number of worms in each haul is plotted side by side with the tidal amplitude for that night. External influences such as the tidal rhythm or the lunar periodicity in the swarming behaviour are not quite clear from these figures, and conclusive evidence is difficult

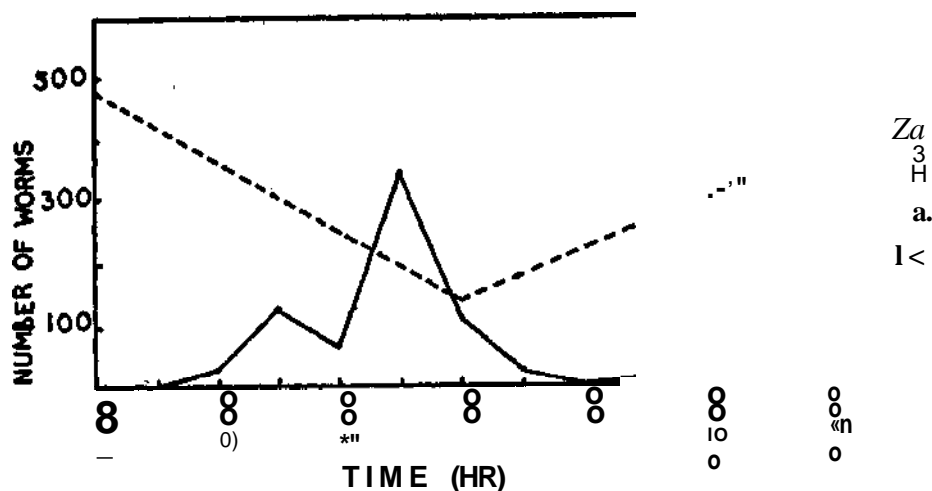


FIG. 2. The number of worms in each haul at every hour. The total number in the entire collection for the night was 830. Broken line shows tidal amplitude.

to obtain, as observations will have to be more frequent and continuous. However, it may be said in general that more intense swarming occurs usually between the Full Moon and the last quarter while the worms were either totally absent or

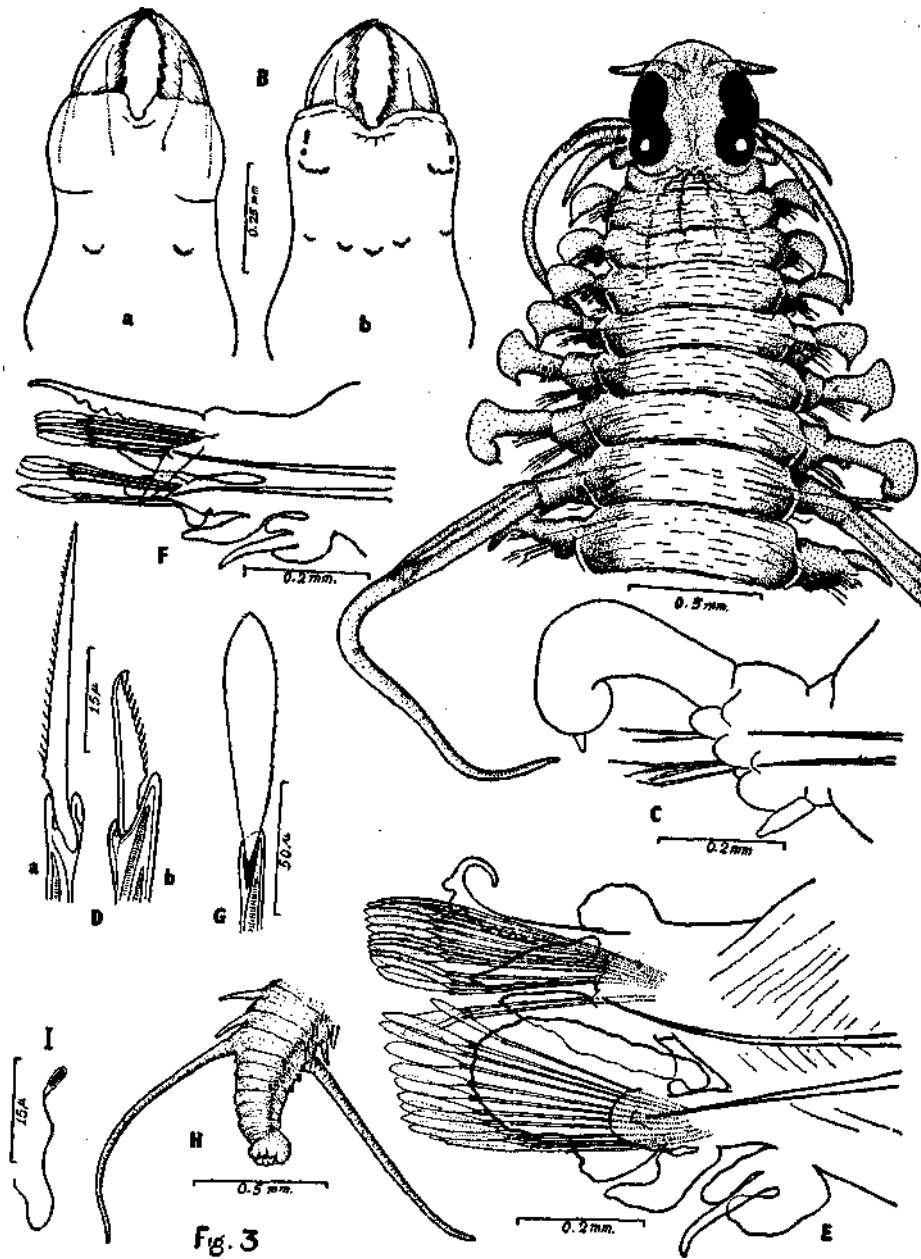


FIG. 3. *Platynereis abnormis*. Male. A. head and anterior region~showing the elongated dorsal cirrus on the 7th setiger; B. everted proboscis with paragnaths of the dorsal (a) and ventral (b) sides; C. parapodium of the 6th atokous segment; D. spiniger (a) and lower falciger, (b) from the 6th foot; E. & F. parapodia from the middle and end of the epitokous region, with paddle-shaped setae; G. & H. anal end; I. spermatozoon,

were seen in insignificant numbers in the hauls taken during the New Moon and the first quarter.

Almost all the individuals in the various collections examined were mature males with ripe spermatozoa that often escape by the rupture of the body wall even under the gentle pressure of the cover glass during microscopic examination. The absence of females might show that their number, if at all present in the same swarm, should have been only very small compared to the other sex. Apparently this seems to be the experience of earlier observers including Aiyar and Panikkar (1937) who were able to obtain only males with the reproductive bodies mostly discharged from the body cavity.

No luminescence was observed at any time when the swarming occurred. The phenomenon is thus not to be confused with what one might often come across in these localities, of sporadic phosphorescence on the surface of the water. This is caused by the syllid worm *Odontosyllis graveleyi* Fauvel, individuals of which just rise to the surface and leave a bright phosphorescent serpentine trail, each lasting for a few seconds (Fauvel, 1930).

The concentration of the worms in relatively large numbers under the light as compared to in the darker regions seems to suggest the presence of some positive phototropic influence underlying this behaviour. While the possession of enormously sized eyes would support this view, there is no experimental proof for such positive tropism among these worms. In fact, a few experiments conducted have not given any conclusive results.

While sorting out the collections it has been found that the swarms are not always constituted by any single species, although most often one or two species distinctly dominate. The variations during the sexual phase and the availability of only the males make positive identification difficult. Even on a cursory examination four types of worms can be distinguished by their size and other characteristics. For example the most common type among them, and which occurred on all days, measured on an average 20 mm. in length. This species possesses an elongated cirrus on the 7th parapodia. In this and other characters the species agrees well with the description of *Platynereis abnormis* Horst. However, the absence of paragnaths in group II noticed in the present specimens can be a minor variation. In the gross external characters the species somewhat resembles *P. egegecirrata* which is also said to have an elongated dorsal cirrus on its 6th parapodia as described by Pettibone (1956). The distinguishing characters of the present specimens of *P. abnormis* are shown in Figure 3. The species next in abundance is characterised by the presence of a long 'tail' following the epitokous region and the whole worm measures on an average 28 mm. The absence of the paragnaths in the oral ring together with other diagnostic features helps to place this under the genus *Ceratonereis*. The other two species are of minor significance because of their relatively small numbers in the swarm and seen only at infrequent intervals. Both these are much larger and measure up to 40 mm. and appear to belong to the genus *Nereis*. Specific identification and other details will be published in due course.

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SUMMARY

A brief description and discussion of the swarming phenomenon of the heteronereid polychaetes in the shallow waters of the Gulf of Mannar are given. While majority of the swarming individuals consisted of *Platynereis abnormis*, three other species were also involved.

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